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UTILITY Patent Specification

Inventors: Alan Kronenberg, Mark Kronenberg

Title: **VENDING MACHINE SERVICE SYSTEM AND METHOD THEREFORE**

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prepared by:
Joseph T. Regard, Ltd.
(a professional law corporation)
Registered U.S. Patent Attorneys
Post Office Drawer 429
Madisonville, Louisiana 70447-0429 USA
Telephone (504) 845-0000

TECHNICAL FIELD of the INVENTION

The present invention relates to systems for communicating operational and status conditions from a remote apparatus to an administrator, and in particular to a system for

10 transmitting vending machine inventory and operational data from one or more vending units to a service vehicle in the general vicinity.

The preferred embodiment of the present invention teaches a monitoring module configured to interface with a communications port or existing DEX/UCS port in a vending machine, the monitoring module configured to periodically poll the equipment to receive

15 operational and/or inventory data, which data, along with an identifier for identifying the particular equipment, is transmitted to a mobile service vehicle at a designated reception area and received via a receiver unit, which receiver unit is configured to interface with a portable computer so as to transfer operational and/or inventory data from said vending machine(s).

In an area with multiple vending machines, transmitters associated with each machine or

20 bank of machines to transmit data independently to the service vehicle. Each transmitter may be configured or calibrated so as to insure optimal reception of the data by the service vehicle in the designated reception area.

The portable computer receiving the data is configured to provide to the route operator/service personnel with operational and/or inventory data on the vending machine(s), so

25 as to allow the service personnel to pull the necessary inventory for stocking the machines without the necessity of a physical inventory, thereby significantly reducing restocking and overall route service time.

In addition to inventory data, the present system also compiles and transmits coin box

5   activity, which can be used in implementing a coin box balance feature by the route operator. In such an application, a portable computer displays activity relating to coin box or product inventory changes from the period of reception at the service vehicle to the point where the unit is opened for replenishing inventory and emptying the coin box, so that the operator may properly balance out the unit.

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BACKGROUND OF THE INVENTION

        Currently vending machine service personnel must park their route truck outside of a facility

15   containing one or many vending machines. These facilities can include, for example, small buildings, large factories, or tall office buildings. The service personnel must then go to each machine, record the necessary product and cash inventory needed by each machine, and then return to the truck to pull this inventory. In pulling the inventory the service person must count out the quantity of each product needed because the driver cannot accommodate transporting full

20   cases of each product between the truck and machines. Many times a service person will handle as many as 80 different products within a facility and that many cases will not fit on a hand truck.

        In some instances route service personnel will guess what the inventory requirements will be for the machines within the facility but cannot adequately service the equipment because they will not always have enough inventory when they get to the machine and often have products that

25   do not sell in the specific machines.

        There is current technology whereby vending equipment can provide current and historical data to an external collection device via a direct connection to a DEX/UCS port. In current

5   technology, companies and individuals are using portable computers to retrieve this data and

provide it to the route service personnel as well as management systems at the company offices.

In this technology however, the route service personnel must first travel to the machine in order

to plug in the collection device. In addition, the DEX/UCS information provided by the vending

machines consists of a large amount of data such as coins and currency put in the machine,

10   amount of coins refunded by the machine, amount of coin and currency that goes into the money

box in the machine, the amount of currency that goes into the bill validator that verifies currency,

the amount of coins that go into the coin changer that verifies coins and provides change, the

amount of product that is sold in the machine, the amount of free vends made by the machine,

machine identification information, and much more. While the information provided via the

15   DEX/UCS interface is detailed, it is more than is required for normal inventory replenishing and

cash box collection.

      Because the above route methods require that the driver physically inventory each

machine, travel to the service van to collect the stock, then travel back to the vending machine

for replenishing, an inordinate amount of time generally passes between the time of inventory and

20   the replenishing of the machine. Additional sales of items will occur during this intermediary

period, which will result in the machine not being properly stocked or cashed out even after it has

been serviced.

      While the prior art further encompasses vending machines which include transmitters or

other communication means for relaying inventory or operational data to a remote location, these

25   systems have been designed for communications with a remote, central office, which administers

the machines from a distance, as opposed to a system which transmits data efficiently and

cheaply directly to a service vehicle within the immediate vicinity of the machines. Such prior art

5   systems have relied upon cellular telephone modems, direct to satellite systems, land line

telephones, and trunk RF relay systems for said communications. In all such instances, the

system was either very expensive to implement and maintain.

Wherefore, the present inventor believes that there has existed a long felt but unresolved

need for a system for transmitting from a vending machine real time inventory, collection, and/or

10 operational conditions to a service vehicle within the immediate vicinity for utilization by the route

operator in replenishing and cashing out the machines, which system is relatively universal in

operation, as well as being inexpensive to implement and maintain.

15   **GENERAL SUMMARY DISCUSSION OF THE INVENTION**

Unlike the prior art, the present invention teaches a system for service vehicle monitoring

of vending machines for route servicing which provides current, accurate, relevant information,

while being relatively cost effective in installation and maintenance, and reliable in operation.

20   For years the vending industry has worked to produce a system which would allow vending

equipment to export information about the operation of that equipment and provide management

information such as the amount of product sold, the value of the product sold, the amount of cash

received, etc. The resulting specification is known as the DEX/USC specification, which can

export all data fields to a secondary device outside of the vending machine, which can be

25 programmed for various operations including maintenance, sales data, inventory replenishing,

or the like.

The preferred embodiment of the present invention teaches a system for managing vending

5   machines and the like, wherein there is provided a monitoring assembly configured to interface

with existing machines via a universal data port (UDP), for example, a DEX/UCS data port, or RS-

232 com port, which assembly monitors inventory and coin box activity as reported by the port

from the machine, and reports same via a transmitted RF stream to a service van in the vicinity

of the machine(s).

10   The service van receives the data from a transmitter assembly, which is configured to

interface with a portable computer device, which device displays or otherwise utilizes the received

data to compile and communicate inventory, operational status, cash box, and other information

to the operator for use in replenishing and servicing the machine(s).

          What is believed to set the present system apart from prior art reporting systems is that the

15   present system is configured to provide real-time information from vending machines at a facility

to a service vehicle situated in the vicinity of the machines.

          In use, the service vehicle would park in the vicinity of the machines, in an area which may

be pre-designated, and receive transmissions from vending machines within walking distance

therefrom, so as to enable the service person to collect the inventory, change, and other items

20   necessary to replenish the machines prior to visiting the machines.

          At the vending machine(s) the monitoring assembly of the present invention periodically

polls the vending machine via the DEX/UCS port to retrieve selective, relevant data. A

microprocessor associated with the monitoring assembly retrieves relevant data from a data

stream to filter down the data to that which is relevant to the route operator, which filtered data

25   is then transmitted as a data stream, with an identifier appended to the stream identifying the

particular machine. It is important that the data stream be as short as possible as, in the preferred

embodiment of the machine, each machine or bank of machines may simultaneously transmit its

5   own data stream with identification information for each machine. To keep costs to a minimum,

the preferred embodiment of the machine contemplates one-way transmissions of data via RF

from the machines to the route vehicle in the form of independent, repeated transmissions of

each data stream from each machine or set of machines.

Alternatively, the transmissions can be synchronized by time to avoid simultaneous

10 transmissions interrupting each other, or separate frequencies, frequency hopping, spread

spectrum, or other transmittal technique could be utilized to insure proper reception of each data

stream transmission.

When a route driver reaches a designated area, a receiving module situated within and

ideally powered by the route vehicle receives the transmission from the machine, transferring the

15 data (via, for example, a cable connection) to a hand held computer which generates a picking

ticket with the identity of the machine and required inventory; coin information may also be

provided so as to replenish change stock in the machine and information as to the amount of cash

to be brought back to the corporate office.

The DEX/UCS data provides intricate and detailed information on the operations of each

20 vending machine, much of which is irrelevant to the route operator from an inventory and cash

out standpoint. Because the monitoring assembly is programmed to filter out the extraneous data

to that required for inventory and money management, thereby providing a reduced set of data,

a decrease in transmitting time is achieved, streamlining transmission and simplifying the route

process. The processor reading the DEX/UCS information may utilize both cumulative as well as

25 interval data provided to compute the appropriate values. The receiver mounted in the truck may

be configured to run on 12 volts and obtain power from the service van.

The present system is designed to be utilized with a plurality of machines in diverse areas

7

5   within a limited vicinity, generally about 1 mile line of sight. The machines can be arranged on

multiple floors of several nearby buildings. A transmitter may be mounted to a single machine,

or may be shared by a bank of adjoining machines as a network. A transmitter mounted to a bank

of machines would transmit a data stream for each of the vending machines in the bank. The

hand held computer can be configured to arrange services instructions for each machine in an

10 order corresponding to a route which the route operator may follow from the van, and the hand

held unit may include in memory instructions relating to the location of each machine, for use by

a new operator or for large facilities.

Thus, the inventory may be arranged in an order which follows the delivery procedure

chronologically for each machine along the route, in order to further speed up the efficiency of the

15 service process, by indicating specific inventory product for each slot in the vending machine.

A database program in the portable computer device can be programmed to utilize the raw

operational data from the received data stream to translate machine operations, i.e., chute

deployments via motor movements, into actual product dispensed for those reporting systems

which provide only this basic information.

20 In addition to individual inventories for each machine, the portable computer may provide

totals of product required for the entire route, so that the operator can determine if enough product

is available in the service vehicle for replenishing the total inventory, and, if not, whether and what

type of substitutes will be provided. Such substitutes may be noted by the operator in the

database for future reference. Power outage data may also be provided to the route operator in

25 the form of a signal from the monitoring module transmitted to the route operator indicating a

power outage occurred, which indication can also include time and duration of the outage. In the

alternative, an indicator light or other signal may be provided to the operator when the operator

5   opens the machine to be serviced, to indicate whether a power outage has occurred.

The coin data provided in the data stream allows the service personnel to convey to each machine the exact amount of change necessary to restock the coin tubes, thereby reducing the amount of monies carried by the personnel. The total amount of money in the cash box of each machine may be included in the data stream transmitted to the receiving unit, as indicated, so that

10 the portable computer may be brought to the home office after completion of the route, the information on the inventory stocked, change dispensed, and monies received by each machine downloaded into the computer, and the information utilized for the records and to verify the monies and stock returned by the driver.

During each route, upon replenishing each machine, the route operator will activate a reset

15 switch for each machine in order to reset the counters within the monitor unit, indicating that the machine has been fully stocked.

It is therefore an object of the present invention to provide a system for transmitting inventory, change, and cash box data from a vending unit to a service vehicle within the vicinity which may be added to most vending machines on the market incorporating communications

20 ports.

It is another object of the present invention to provide a system for simplifying a vending machine route by eliminating the need for an initial trip to the machines to discern inventory requirements.

It is another object of the present invention to provide a system for communicating vending

25 machine status, inventory, cash box, and related information to a nearby service vehicle which is relatively easy to implement, inexpensive to operate and maintain, and reliable in operation.

It is another object of the present invention to provide a system for transmitting cumulative

5   data from a plurality of vending machines within a local area to a hand held computer, which

computer may be utilized for gathering inventory for replenishing or restocking the machines,

providing change for the machines, as well as providing cash box data for the home office for

verification of monies received, for increasing accuracy in bookkeeping as well as reducing theft.

It is another object of the present invention to provide a system for receiving simultaneous

10   transmissions from a plurality of vending machines and incorporating same into a pick ticket which

includes the inventory requirements for each machine in order of the route schedule, thereby

simplifying the task for the operator.

Lastly, it is an object of the present invention to provide a method and system for providing

transmissions from a plurality of vending machines in diverse locations in a local area so that said

15   transmissions overlap in at least one predesignated reception area where a service vehicle can

locate to receive status data from said plurality of machines.

BRIEF DESCRIPTION OF DRAWINGS

For a further understanding of the nature and objects of the present invention, reference should be had to the following detailed description, taken in conjunction with the accompanying drawings, in which like parts are given like reference numerals, and wherein:

Figure 1 is an isometric view of the overall system of the present invention, illustrating multiple vending units at disparate locations within a local area transmitting data to a route vehicle.

Figure 2 is a top, partially cut-away view of the invention of Figure 1, illustrating the reception range of the transmitters to an exemplary reception area.

Figure 3 is a front view of an exemplary vending machine of the present invention, illustrating the various components of the machine and the transmitter module, with an exemplary external antenna mounted thereupon for illustration purposes.

Figure 4 is an overall schematic view of the equipment utilized in facilitating the present invention.

Figure 5A is a top view of an exemplary portable computer device or hand held computer of the present invention.

Figure 5B is a top view of an exemplary portable computer device or hand held computer of the present invention.

Figure 6 is a flow chart illustrating an exemplary operation of the hand held computer of Figures 5A and 5B.

Figure 7 illustrates the various steps in accomplishing a method of the present invention.

Detailed Discussion of the Invention

Referring to **Figure 1**, the system of the present invention **S** is configured to be implemented at a local area **LA** wherein there are provided a plurality of vending machines **8, 9, 10, 11, 12** situated in spaced relationship from one another and a service vehicle, although it is noted that the present system can be utilized with a single machine where it is located a distance from the service vehicle. As shown, an exemplary location could comprise, for example, first **1** and second **2** buildings, the first building shown having floors **3, 4, 5, 6, 7**, the second building also having multiple floors, wherein there is located in diverse locations vending machines **8, 9, 10, 11, 12,** each vending machine having a transmitter for transmitting **13** a data stream continuously, or at periodic intervals, the transmission directed to a service van **15** having a receiver and an antenna **14**, situated within a reception area **RA.** Unlike the external antenna shown, the present system may also utilize an internal antenna

Continuing with **Figures 1**, **3**, and **4**, the transmitter unit **53, 53'** of the present invention is configured to be retrofitted to a vending machine **39, 19** which has a data port **55** configured to provide data via the DEX/UCS standard (or some other standard) from the CPU/controller board **39'** of the machine.

The CPU/Controller board controls the functions of the machine, including dispensing of product **25, 26**, situated in chutes **23, 24**, and displayed in a selection area **22** product which is selected by the customer via input pad **34** (which may include a display **35**. Payment is made via coin slot **32** or bill machine **33**, while change is provided automatically via the change slot **36,.** Coin return button **38** is typically provided to allow the customer the ability to refund the coins

5   placed in the machine, should they change their mind as to a purchase.

In the present example, a dispensing coil **27** retaining the selected product is configured

to rotate **28** via a step motor which is energized via instructions from the CPU/controller board

after payment is acknowledged and selection made; other dispensing means are well known and

practiced in the art as well for diverse vending machines including can dispensers (soft drink

10   machines), cigarette machines, sandwich machines, beverage/cup machines (coffee machines)

and many others, any of which could be adopted to work with the system of the present invention.

In the exemplary machine shown, the product **25** is dispensed **29** to a retrieval bin **30** where it

is retrieved by the customer via door **31**. Coin payment is accumulated in a cash box **37**.

Inventory replenishing of product, servicing of the machine, and retrieval of the cash is

15   typically accomplished by opening **21** the front panel **20** of the machine, which is hingedly joined

to the body of the machine and locked in place like a door.

All of the functions of the machine are reported by the CPU/Controller board to the

DEX/UCS port **55** including, for example, coins and currency put in the machine, amount of coin

refunded by the machine, amount of coin and currency that goes into the money box in the

20   machine, the amount of currency that goes into the bill validator that verifies currency, the amount

of coins that go into the coin changer that verifies coins and provides change, the amount of

product that sold in the machine, the amount of free vends made by the machine, machine

identification information, etc.   Other systems may provide more basic data, such as the amount

of times that a particular motor turned, indirectly indicating how much product was dispensed by

25   that motor.

The present invention summarizes this data into useable form and transmits same so that

it may be received by a service van **15** after it arrives at the route location or local area **LA**. In

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5   accomplishing this task, a transmit unit **53** is provided to receive, manipulate, and transmit the

data from the vending machine, the transmit unit first having a monitoring assembly **74** which

receives the data from the DEX/UCS port **55** via an interface cable **56**.   The   monitoring

assembly **74** periodically polls the DEX/UCS port of the vending machine to gather data,

processing same and accumulating totals for product and cash inventory, and utilizes said raw

10   data to compile in real time sales totals for each selection carried by the machine or bank of

machines, cash received, coin change status, as well as an identifier for identifying each machine

in association with said totals, cumulatively referred to as inventory data.

When determining the quantities provided by DEX/UCS, the monitor assembly must

perform several calculations.   In the preferred embodiment of the invention, the DEX/USC

15   provides data in the form of cumulative values, which never reset and/or interval data that resets

each time the machine is read. The monitoring assembly **74** should first determine what type of

values, cumulative or interval, are represented. The preferred embodiment of the system of the

present invention, as currently programmed, automatically uses cumulative data if it is available

and if it is not then uses interval data.

20   If the machine utilizes cumulative values, the monitoring assembly **74** compares the

cumulative values from the last time the vending machine was polled to the differences updated

in the monitor unit as the sales values. If no cumulative values exist, then the interval values will

be added to the sales values stored in the monitoring assembly. The monitor unit should include

a reset switch to reset the counters by the operator whenever the vending machine is restocked,

25   so that the monitoring unit will reset and begin to accumulate new sales figures for the next

service.

This inventory and other data should be converted from its format (for example RS232 to

5   TTL for transmission via a TTL converter, as it is relayed to a transmitter module **75** which

transmits a signal **61** incorporating said data via an antenna **54**. The preferred embodiment of the

invention contemplates RF transmission, but other communication means, including laser, fiber

optic, RF, cable, or other means may be likewise utilized. RF transmission could be via a single

frequency, spread spectrum, frequency hopping, BPSK, or other technique could be similarly

10   utilized to communicate the data directly to the service vehicle.

The transmit unit **53** may be situated within the vending machine and accessible by the

door, or may be mounted upon the unit in the vicinity of the antenna, and may include status lights

or LEDs so as to power **59'**, receipt of data from vending machine **58**, transmission of data to the

vending machine **58** (in two way applications), and transmit data to the transmitter module **75** light

15   **59**. Power for the transmitter unit **53** may be provided by an AC adapter **60**, or alternatively by

the vending machine power supply.

Each of the vending machines may incorporate its own transmitter unit for independent

transmission to the van, and/or a bank of adjacent or nearby machines may be networked via a

hub or the like to a single transmitter unit, which would likewise compile a data stream for each

20   vending machine in the network, identifying the machine and inventory and cash data as part of

the data stream. In addition to inventory and cash data, operational status information, such as

mechanical malfunctions, tampering, power failure, and other operational irregularities may also

be transmitted as part of the data stream utilizing existing software, hardware and transmission

techniques.

25   Exemplary lights which may be provided in the preferred embodiment include power,

transmit, receive, DEX (lit when polling), TU (lit when monitor unit is talking to transmitter), and

reset. The present transmitter transmits data via spread spectrum technique at a frequency of

5   about 900 MHz and power of 50 mA having an anticipated range in the city of about 2000 feet

(about .3 mile) and an unobstructed range of about 1 mile Of course, the performance of the

present system can vary substantially depending upon obstructions, electromagnetic interference,

geography, position, and other factors.

The service van **15**, which carries inventory and the route operator, has situated therein

10   the receiver unit **62** which includes a receiver module **64** which receives a signal via the antenna

14 in the vicinity of the vehicle via antenna port **63**, and relays said signal to an interface module

65, which converts said data to a useable format which may be understood and processed to a

hand held or portable computer **73** via transfer cable **71** and cable port **72**.   The receiver unit **62**

may include a power light or LED **66**, a receive light **67** to indicate receipt of data from the receiver

15   module, a receiver data transmit light **68**, and a receive data from portable computer light **69**.

In use, the service route operator would arrive in the route vehicle **15**, and park the vehicle

15 in an area known to receive signals from all vending machines to be serviced. Upon arriving

at a reception area **RA**, the receiver unit **62** receives a signal transmitted independently by

vending machines **8, 9**, and **10** in the first building **1**, and vending machines **11, 12** in the second

20   building **2**. The data is downloaded to the hand held or portable computer **73**, which takes the

data and generates same for use by the route operator.

Continuing with **Figures 1, 5A**, and **6**, the hand held or portable computer **73** receives the

transmitted data from the receiver and is programmed to display via display screen **76** data

representing status of the vending machines whose transmissions were received. Control and

25   data input of the computer is accomplished via alphanumeric keypad **77**.

Programming and software utilized by the unit may vary and may utilize reasonable skill

to accomplish, and may take the form of a database of each machine, each dispensing chute for

5　　each machine and its location on the machine, and detailed cash and change data on the machine, as well as detailed location information on the ma chine. Further route data on the most efficient order to service machines may be programmed into the unit so as to direct the operator to each machine on the route in the most efficient order, allowing the operator to compile inventory according to each machine in the route in proper order for the route.

10　　　　Other data may be provided; for example, the portable computer **73** display may indicate the general location **78, 78'** of a machine or bank of machines, and give inventory summaries by category of machine **79, 79'**, respectively, so that the route driver can determine that sufficient sales have occurred to justify restocking the machines.

　　　　As shown in **Figure 5B**, in preparing the inventory list, or "picking ticket" (which can be
15　displayed or printed) the portable computer **73** indicates the particular machine **80**, which may have an identifier number (and may also indicate the location or other description), and indicates each dispensing chute **81, 82, 83, 84**, and corresponding sales data **85, 86** for each said chute, so that the stock may be pulled from the inventory on the service or route vehicle in preparation for replenishing same.

20　　　　As indicated, the machines may be presented in a particular order corresponding to the best, most efficient order on the route to service the machines, and may include descriptive criteria including the building, floor, directions, pass codes, access hours, or other information which may be programmed in via the alphanumeric keyboard or at the office.

　　　　Further, substitutions may be indicated on the machine via programmed data from the
25　office, or messages or notes may be inputted regarding machine operations or observations for the office or service personnel to refer to at a later time.

　　　　As shown in **Figures 2** and **7**, a summary of a method of the present invention may be

expressed as follows:

a) Receive DEX/USC Data from a first vending machine **43** via the monitoring assembly, in the manner discussed above.

b) Remove data unrelated to inventory, cash, operational status, or machine ID utilizing programming in the monitoring assembly, as earlier discussed.

c) Prepare transmission string representing identification of machine, inventory data, cash data, and/or operational status, and forwarding said transmission string to said transmitter module;

d) Transmitting **49** said transmission string to broadcast within limited transmission range **45, 45** within a limited, local area **40**, and repeating said transmission to maintain a flow of data on said machine to the reception area **47**; while

e) Updating said transmission string as new data is received, for example, as might occur with each sale of product from said machine.

f) repeating steps a-e for any additional vending machines **51, 44** to be serviced in the vicinity, so as to provide multiple transmissions **49, 50** to the reception area;

g) Position a service **48** vehicle within the reception area **47** of said transmissions;

h) Receive said transmissions, and utilize said transmissions via the portable computer to pull inventory and money change from said vehicle for servicing each of said machines, providing stock for filling machine inventories, as well as compiling an ordered list for servicing each machine based upon the determined best schedule.

I) indicating to the personnel via a portable computer display which machine is to be serviced next (may include information on which building **41, 42**, floor, or other description of location);

j) allowing the service personnel to convey said machine inventory to said machine;

k) stocking said machine, replenishing change, and resetting the machine;

l) repeating steps I-k until each of the machines is stocked;

m) returning to the service van with the portable computer;

n) when more areas are to be serviced, traveling to the next local area LA and repeat steps

a-m

o) uploading data from the portable computer to the administrative office and downloading

data from the administrative office to the portable computer.

As earlier indicated, a bank of machines **51** can share a common transmitter **52** if the

machines are located in the immediate vicinity of one another, thereby lessening the amount of

hardware needed, as well as RF emissions in the locale.

The software on the hand held or portable computer should allow the service personnel

to adjust the inventory level on each machine for each product, so that accurate product

requirements can be calculated. For example, if a machine will hold 20 pieces of a product in one

selection, and the driver only leaves 18 units in the machine when it is finished being serviced,

then the software on the portable computer must account for the shortage of those two units.

Since the vending machine may only provide information about the number of units that

were sold from the machine, in order to provide the employee with an accurate count, the software

in the portable computer should add the two that were missing to the value provided by the

vending machine. An example would be if the vending machine indicates that five product were

sold but we know that the employee left two units empty in the machine the last time, then the

portable software should indicate that seven units are required.

An example of a programming chart for the hand held, or portable computer used in the

present invention for the route servicing of the vending machines is shown in **Figures 1, 4,** and

6.

As shown, after the route vehicle **15** arrives in the reception area **RA**, the hand-held or

portable computer unit:

- polls the receiver unit **62** to discern reception of data from all of the vending machines

known in the area;

- the data from the various machines in the area is stored, the user/operator is shown a

display of all locations and the machines for which data has been received. This may include how

empty the machine is to enable the user/operator to determine if service is required;

- user then has different choices as to how to pull inventory for the machines in the area,

namely:

- the user/operator can select to print a picking ticket for the products required for

each machine showing each machine individually; or

- user can select to print a picking ticket for the total of each product required for all

machines; or

- user can select all locations or tag particular ones to view; then

- the user can then display to the screen **53** the picking ticket for the products

required for each individual machine; or

- the user can print the picking ticket for the products required for each

individual machine; or

- the user can select to display to the screen the picking ticket for the total of

each product required for all machines; or

- the user can select to print the picking ticket for the total of each product

required for all machines;

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5   The user may change the product name for any product in the inventory, which may be displayed as a list or in the form of a grid in a spreadsheet or the like.

At the end of the day, the hand-held or portable computer can provide:

- a time report on events which occurred during the day;

- close the day; and/or

10   - connect to the host computer and upload the data of the day for the route serviced.

Miscellaneous file maintenance functions may be performed on the:

- product file

- bar code file

- location file

15   - machine file

- dispensing chute or more commonly referred to as grid file; or

- system configuration.

The present invention thereby provides a system which utilizes the vending machine data at a site to reduce it to an efficient, useable form, transmitting the data to an arriving service or 20 route vehicle, and providing to the route operator or service personnel the inventory and/or other information they need at the vehicle before they visit the machine, so as to increase employee efficiency, reduce service time, and improve inventory control.

The information stored in the portable computer and downloaded to the administrative office further allows for better merchandising of the vending machine, and this, coupled with the more 25 efficient servicing of the units results in increased overall sales.

5   A summary of the reference numerals and descriptions utilized in the present application

follows:

Element	Description
S	System of present invention
LA	Local Area
RA	Reception Area
1	first building
2	second building
3	first floor
4	second floor
5	third floor
6	fourth floor
7	ninth floor
8	vm1
9	vm2
10	vm3
11	vm4
12	vm5
13	transmit
14	antenna
15	service van
16	reception antenna
17	
18	
19	vending machine
20	front panel/door
21	opens

5	22	selection area
	23	chute
	24	chute
	25	product
	26	product
10	27	dispensing coil
	28	rotate
	29	dispense
	30	retrieval bin
	31	door
15	32	coin slot
	33	bill machine
	34	selection pad
	35	display
	36	change slot
20	37	cash box
	38	coin return
	39	vending machine
	39'	CPU/controller board
	40	local area 2
25	41	building one
	42	b2
	43	vm1
	44	vm2
	45	range 1
30	46	range 2
	47	reception area

5	48	van
	49	receives
	50	receives
	51	bank of machines
	52	common transmitter
10	53,=,@	transmitter
	54,=	antenna
	55	dex port
	56	cable
	57	receive light
15	58	transmit 1 light
	59	transmit 2 light
	59'	power light
	60	power source
	61	transmission RF
20	62	receiver
	63	antenna
	64	reception module
	65	interface module
	66	status display
25	67	power light
	68	receive data led
	69	data to portable computer led
	70	data from portable computer led
	71	interface cable
30	72	port
	73	portable computer

5	74	monitoring assembly
	75	transmitter
	76	display
	77	alphanumeric keypad
	78	location information
10	79	general machine type inventory summary
	80	particular machine identification number/indicator
	81	dispensing chute data
	82	"
	83	"
15	84	"
	85	sales data for particular chute
	86	name of item in chute

The invention embodiments herein described are done so in detail for exemplary purposes only, and may be subject to many different variations in design, structure, application and operation methodology. Thus, the detailed disclosures therein should be interpreted in an illustrative, exemplary manner, and not in a limited sense.